PERFORMANCE WORK STATEMENT (PWS)

OPERATIONS SUPPORT SERVICES FOR EPA-CINCINNATI TEST AND EVALUATION FACILITY AND OTHER NRMRL FACILITIES

1.0 BACKGROUND

In support of the Environmental Protection Agency's (EPA) research responsibilities, the National Risk Management Research Laboratory (NRMRL) is responsible for conducting environmental research, testing, evaluation, development and demonstration verification studies. Many of these studies are conducted at the Test and Evaluation (T&E) Facility located in Cincinnati, Ohio. The day-to-day technical operation of this facility, as well as the actual conducting of technical support of the test and evaluation research, development and demonstration verification studies, is performed by a contractor. This PWS supports the activities of the T&E Facility.

The T&E Facility was originally designed as a wastewater treatment research pilot plant to satisfy Agency requirements as perceived at the time of its inception in 1977. Changes in priorities have reduced the need for the facility to specialize only in liquid municipal waste treatment technologies. Research has been expanded to other environmental issues, such as water monitoring, contaminant warning systems, water contamination detection research with various sensors, water infrastructure decontamination, water security experiments, drinking water treatment, infrastructure, source water treatment, watershed management, storm water, bio-sentinel urban water cycles, climate change, solids management, nano-technology and hazardous waste treatment. To address these issues, bench-, pilot- and field-scale plant research and development and small-scale demonstrations are being undertaken in both liquid and solid media. A description of Representative Research Project Descriptions is attached to this solicitation as Attachment 2.

The T&E Facility holds a State of Ohio EPA Director's Exemption under the Resource Conservation and Recovery Act (RCRA). This categorizes the T&E as a Treatment, Storage and Disposal Facility (TSDF). It permits the Facility to accept, store, and treat a wide variety of hazardous wastes in a wide variety of unit processes. Today, under RCRA regulations, the Director's Exemption held by the T&E Facility is one of the most diverse and comprehensive permits held by any hazardous waste research facility in the United States in terms of both permitted treatment technologies and the number of hazardous wastes. Also, under Ohio's RCRA Small Quantity Treatability Exclusion, the T&E Facility conducts treatability studies using any technology for small quantities of all categories of hazardous wastes. The broad coverage provided by Ohio regulations makes it possible to perform a wide range of waste treatment studies unmatched by any similar facility in the nation.

The T&E Facility is primarily used to conduct research, development and demonstration studies in direct support of NRMRL's assigned mission. Contractor involvement in any one research study will range from a minimum of project coordination and facilitation to full design, implementation, and operation. In addition to the stated primary use of the T&E Facility in direct support of NRMRL, the T&E Facility's capabilities are available to other EPA research organizations as well as public and private sector clients who may wish to conduct studies or participate in areas of research in which the T&E Facility is uniquely qualified and permitted to work.

Research activities at the T&E Facility with others outside of the Agency are encouraged. As a result, the diverse capabilities of the T&E Facility are now available to state and local governments, other Agencies and Departments, business and industry, and schools and colleges through Cooperative Research and Development Agreements (CRADA's) with EPA. These cooperative efforts under the Federal Technology Transfer Act of 1986 (Public Law 99-502) and Interagency Agreements are encouraged. Also, the contractor is encouraged to support EPA in the promotion and collaboration between regions and ORD through the Regional Applied Research Effort (RARE) Program. This program provides the regions with near-term research on high-priority, region-specific science needs, improved collaboration between regions and ORD laboratories and centers, and builds a foundation for future scientific interaction. In addition, public and private sector groups may conduct technology feasibility determinations and other studies that are within the research concern of the USEPA through a contractual arrangement, referred to as a "Third Party Contract," with the contractor for the T&E Facility. Third party use of the facility shall be approved by the Contracting Officer prior to initiation of work.

Research efforts at the T&E Facility can encompass bench-scale or pilot-scale studies on developing innovative technologies, as well as larger scale studies when required to field test and demonstrate technologies previously conceived, designed, fabricated, or operated at the T&E Facility at bench- or pilot-plant scale.

2.0 GENERAL WORK REQUIREMENTS

The contractor shall provide all labor and services necessary to provide the base support as described in this PWS.

Most of the actual testing and evaluation will take place at the T&E Facility located at 1600 Gest Street, Cincinnati, Ohio. However, some of the preliminary preparations and follow up activities, such as report writing and data analysis, may take place in the contractor's home office. Testing, evaluation, verification and demonstrations can also be conducted at satellite field locations depending upon specific project requirements and under the technical direction of the Work Assignment Manager.

Operation of the facility routinely involves the testing and evaluation of pilot- and bench-scale water supply treatment and distribution system studies and wastewater treatment, pollution control, and other related technologies. This also involves the routine support of controlled studies and the operation and maintenance of EPA's simulated water distribution system related to water security research issues. In addition, watershed management, infrastructure, organic based biofuel, storm water, urban water cycles, bio-sentinel, climate change, solids management, nano-technology, source water treatment and potable water research studies and demonstrations are conducted. Testing and evaluation shall also include low-cost, water saving treatment systems that are integrated into renewable energy sources and residual handling technology, Waters and wastewaters treated include those of domestic, municipal, synthetic or industrial origin and contain toxic substances as defined by several different EPA legislative directives. These waters and wastewaters include those classified as toxic and/or hazardous wastes as well. Other sample and waste matrices such as air, soils, sediments, residuals, debris and sludges shall also be used in on-site and on-site related bench-, pilot- and field-scale studies and technology evaluations and demonstrations, when required.

The contractor shall also provide support in research related concerns of health, safety, permits, and environmental compliance for locations over which the T&E Facility has administrative or management control.

The contractor shall also conduct field drinking water distribution studies under which the contractor shall be required to plan a study, collect and analyze water samples, utilize existing water distribution flow models and prepare reports on those studies.

The contractor shall also design and fabricate pipe loop systems to be used to simulate drinking water distribution systems. Operation of both existing and new pipe loops shall be required to understand water movement, water quality monitoring sensor technologies, particle and chemical deposition (or attachment) in a pipe network, pipe flushing scenarios and pipe cleaning techniques. The contractor shall perform controlled studies to evaluate and understand the concepts above as they may pertain to water security issues.

In the performance of work under this contract, the contractor shall comply with all applicable environmental regulations and permits. The contractor shall comply with the "T&E Facility Standard Operating Procedures".

3.0 RESEARCH SUPPORT

The contractor shall support research operations in the following general areas:

1. Project design, including project specific literature review or technology assessment, engineering analysis, sampling and analysis plans, project specific health and safety plans, quality assurance project plans, and project scheduling.

2. Equipment and process design, including detailed design, drawings, and specifications; materials procurement; process equipment fabrication; equipment assembly and installation; and equipment decontamination and disassembly.

3. Bench- and pilot-scale experimental treatment systems. This includes tasks such as experimental equipment operation and maintenance; sample collection and analysis; research data generation, reduction, and analysis; computer manipulation of data; draft interim and draft final project report preparation; and development and implementation of research equipment closure plans.

4. Field testing of bench- and pilot-scale unit processes, treatment systems, and monitoring systems at sites identified by the EPA Project Officer/Work Assignment Manager. Such evaluations are limited to equipment fabricated or processes previously conceived or tested at the T&E Facility, and are conducted to produce research data for technologies not commercially available.

5. Support to meet and maintain permit and compliance requirements which are directly related to all permits which the T&E Facility is required to have or are incidental to ongoing facility-specific research studies. These activities include on-site chemical inventory tracking and control, on-site hazardous waste tracking, hazardous waste sample storage control, implementation of Chemical Hygiene Plan protocols, manifest document preparation, effluent analysis for discharge, permitting document drafting, and site specific training of T&E researchers in compliance with permit requirements.

3.1 Facility Operations and Support Requirements

The contractor shall provide labor and services necessary to support operation of the T&E Facility. Normal operating hours for the T&E Facility are Monday through Friday from 6:00 a.m. to 6:00 p.m. The T&E Facility shall be closed during normal EPA scheduled holidays. Required technical support extending beyond the established schedule for facility operation or specific projects will be discussed with the Project Officer and/or Work Assignment Manager and specified as technical direction for the individual work assignments.

The contractor shall not staff the Facility or project related efforts prior to or after the intended start or finish times unless specific arrangements are made with and requested by specific EPA Work Assignment Managers. Operations different from this schedule will be specified as

technical direction for the individual work assignments for specific projects and studies as required.

The contractor shall operate in accordance with the T&E's Standard Operating Procedures Manual (SOP). This SOP describes routine operational and staffing arrangements of the facility, details basic information pertaining to the conduct of routine testing, and describes required activities and associated records concerning facility maintenance, security, safety, and continual compliance with all applicable environmental protection permits and regulations. The Contractor shall review the SOP Manual annually and recommend, by August 30 of each year, revisions to the Project Officer based upon revised operational procedures required by necessity or which have been requested by EPA. The final revision of the SOP Manual will be decided by the EPA. Upon approval by the Contracting Officer and Project Officer, this manual shall guide the general operation of the Facility.

The Contractor shall not perform O&M services, janitorial services, or guard service for the building. However, the Contractor shall perform operation, maintenance and housekeeping of experimental and laboratory equipment, bench- and pilot-scale work areas, and the high bay research experimental work areas, which are part of the treatment systems, and maintain a safe and healthful working environment in the experimental work areas.

EPA provides 24 hour guard services. Guards shall be notified of any after hour visitors. The EPA security guards shall escort the visitor to the appropriate person or work area. After normal business hours, the contractor personnel shall be admitted with proper identification. A worker shall be identified by a visibly displayed EPA/EPA visitor or Contractor on-site identification badge.

In the general day-to-day technical operation of the T&E Facility and support of all Facility research operations, the Contractor shall perform the following functions:

1. Maintain adequate inventories of health and safety supplies necessary to support all facility research operations.

2. Maintain the T&E Facility visitor log and passes during normal business hours. Normal business hours are from 8:00 AM to 5:00 PM. Maintain a centralized information center to admit and receive, monitor and announce visitors, vendors, and suppliers for project and work assignment related activities during normal business hours. Respond to the emergency call line and make paging and all-call announcements as appropriate. Maintain a centralized supply of up-to-date T&E Facility information packages and disposable visitor safety glasses.

3. Schedule the maintenance and maintain a maintenance log for repair of project and facility related equipment, laboratory instruments, and work tools. Maintain an electronic inventory and maintenance log of project and facility specific equipment and supplies. Update equipment, laboratory instruments, work and machining tools, and supply inventory list quarterly. The electronic inventory shall provide location and quantity of the maintained equipment and supplies.

4. Design, monitor and ensure adequate support utilities to service all high bay projects. Schedule maintenance and maintain a maintenance log for repair and servicing of research support utilities.

5. Develop and maintain a project-specific and facility-wide on-site hazardous waste tracking protocol and records relevant to Ohio EPA RCRA compliance reporting requirements.

6. Assure compliance with all environmental and health and safety requirements, as well as with all operation permits which the facility may hold.

7. Coordinate shipping and receiving and pick-up and return of work assignment specific equipment, supplies and samples necessary to support facility research operations. This shall facilitate transportation of "laboratory samples" to ensure good laboratory practices and Department of Transportation regulatory compliance.

8. Oversee hazardous waste manifesting (in and out shipments) to ensure accuracy of shipping documents and compliance with regulatory requirements

9. Facilitate and schedule the transportation of "treatability samples" to ensure regulatory compliance.

10. Design, fabricate, assemble and disassemble general purpose equipment for multiple purpose experimental usage.

11. Provide specialized machine shop expertise for facility support and for research studies.

12. Provide specialized electronic and electric equipment analysis and troubleshooting, design, installation, operation and maintenance.

13. Troubleshoot machine shop problems and maintain the equipment and supplies. Develop a schedule and assure that periodic maintenance of machine shop tools is completed.

14. Manage general use laboratory equipment, supplies and chemicals and purge outdated

chemicals and supplies when needed.

15. Inspect hazardous waste storage tanks and drum storage areas, and exercise the facility's effluent control valve according to Ohio EPA Director's Exemption.

16. Inspect waste and influent feed supplies and other project specific high bay, bench-and pilot-scale utilities. Inspect effluent and waste discharges and other project specific high bay, bench-and pilot-scale utilities.

17. Calibrate and maintain general use laboratory analytical equipment and high bay monitoring sensors and instruments.

18. Make specific minor adjustments to experimental equipment as directed by the Work Assignment Manager.

19. Ensure and maintain the safety and security of research project areas and all tools and equipment.

20. Perform daily housekeeping within the experimental areas in the pilot-scale high bay, the bench-scale study lab, all chemistry labs, sidewalk facility perimeter, and the contractor-run machine shop area and other experimental areas. Schedule weekly floor and perimeter sidewalk water washes. Schedule monthly facility project experimental area and facility high bay floor washes. At the end of a scheduled work day, the contractor shall assure that work areas are clean of specific debris, tools, and trash. The work area trash collection containers shall be made available for pick-up by the EPA on-site "Housekeeping" contractor. The pick-up area shall be the yellow taped walkway area. At the start of the work day the contractor shall assure the trash collection containers are available in the work area. During the normal work day the contractor is responsible for emptying the trash collection containers into an appropriate collection bin.

21. Maintain chemical inventory, lock-out-tag-out, and Right-to-Know records, references, and displays. Provide as needed training, labeling and marking of equipment and supplies for chemical inventory, lock-out-tag-out, and right-to-know records and displays.

22. Provide expert consultation on T&E experimentally-specific hazardous waste manifesting, importing, transportation, disposal, etc.

23. Provide expertise on Resource Conservation & Recovery Act (RCRA), Superfund Amendments and Reauthorization Act of 1986 (SARA), Occupational Safety and Health

Administration (OSHA), Department of Transportation (DOT), Metropolitan Sewer District (MSD), Safe Drinking Water Act Amendments (SDWAA), US Environmental Protection Agency (USEPA), Ohio Environmental Protection Agency (OEPA), City of Cincinnati, Hamilton County and any other regulatory requirements which are specific to the operation of experimental systems at the T&E Facility.

24. Interpret existing and new regulations which apply specifically to research operations at the T&E Facility.

25. Prepare all permit applications, modifications, revisions, etc. and the OEPA Director's Exemption renewal(s), modifications, revisions, etc.

26. Prepare hazardous waste manifest documents for research related wastes shipped into and from the T&E Facility. The EPA Project Officer or other designated EPA employee shall approve/sign manifests.

27. Prepare required T&E Facility annual hazardous waste management, hazardous waste generator, waste minimization, small quantity treatability, MSD industrial user and other required periodic reports.

28. Provide input for achieving and maintaining acceptable engineering controls and health and safety conditions for general facility and research operations, including the machine shop.

29. Provide input for the cleanup of chemical spills and information on emergency response.

30. Annually update for approval of the Project Officer and/or cognizant Work Assignment Manager, the "T&E Chemical Hygiene Plan" which establishes policy, responsibility and procedures to ensure the safe use of hazardous chemicals in the Facility.

31. Annually provide an update and overview to the Project Officer, of the T&E Facility Chemical Hygiene Plan, Health and Safety Plan, and Standard Operating Procedures; the Occupational Safety and Health Administration, Resource Conservation and Recovery Act policies, responsibilities and procedures to maintain regulatory compliance and ensure a safe working environment associated with the Facility.

32. Assist with in-house and extramural inspections and tours. This shall include project descriptions, posters, and presentations. The contractor shall assist with the design, development, maintenance and updating of interactive electronic poster and virtual tour presentations.

33. Identify, collect and report unused equipment and materials which may be either scrapped or placed in excess in order to minimize unnecessary storage and unnecessary hoarding. The Contractor shall maintain an electronic tracking system for the items placed in excess.

34. Provide other support and services of a facility-wide nature which are not specifically mentioned or detailed herein but are related to requirements specified in the subject contract PWS.

4.0 SUPPORT TO OTHER NRMRL CINCINNATI SATELLITE FACILITIES

In addition to the T&E Facility, the NRMRL also operates research projects at the Center Hill facility in Cincinnati, the Experimental Streams Research Facility in Milford, Ohio, and a small laboratory annex to the main Andrew W. Breidenbach Environmental Research Center (AWBERC-Cincinnati) building known as the Full-Containment Facility. These three locations will henceforth be referred to as the "Facility".

In the general day-to-day technical operation of the Facility and support of all Facility research operations, the Contractor shall perform the following functions:

1. Maintain adequate inventories of health and safety supplies necessary to support all Facility research operations.

2. Maintain a centralized supply of up-to-date Facility information packages and disposable visitor safety glasses.

3. Develop and maintain a project-specific and Facility-wide on-site hazardous waste tracking protocol and records relevant to Ohio EPA RCRA compliance reporting requirements.

4. Assure compliance with all environmental and health and safety requirements, as well as with all operation permits which the Facility may hold.

5. Coordinate shipping and receiving and pick-up and return of work assignment specific equipment, supplies and samples necessary to support Facility research operations. This

shall facilitate transportation of "laboratory samples" to ensure good laboratory practices and Department of Transportation regulatory compliance.

6. Oversee hazardous waste manifesting (in and out shipments) to ensure accuracy of shipping documents and compliance with regulatory requirements

7. Facilitate and schedule the transportation of "treatability samples" to ensure regulatory compliance.

8. Provide expert consultation on experimentally-specific hazardous waste manifesting, importing, transportation, disposal, etc.

9. Provide expertise on Resource Conservation & Recovery Act (RCRA), Superfund Amendments and Reauthorization Act of 1986 (SARA), Occupational Safety and Health Administration (OSHA), Department of Transportation (DOT), Metropolitan Sewer District (MSD), Safe Drinking Water Act Amendments (SDWAA), US Environmental Protection Agency (USEPA), Ohio Environmental Protection Agency (OEPA), City of Cincinnati, Hamilton County and any other regulatory requirements which are specific to the operation of the Facility.

10. Interpret existing and new regulations which apply specifically to research operations at the Facility.

11. Prepare hazardous waste manifest documents for research related wastes shipped into and from the Facility. The EPA Project Officer or other designated EPA employee shall approve/sign manifests.

12. Prepare required Facility annual hazardous waste management, hazardous waste generator, waste minimization, small quantity treatability, MSD industrial user and other required periodic reports.

13. Provide input for achieving and maintaining acceptable engineering controls and health and safety conditions for general Facility and research operations.

14. Provide input for the cleanup of chemical spills and information on emergency response.

15. Annually update for approval of the Project Officer and/or cognizant Work Assignment Manager, a Chemical Hygiene Plan which establishes policy, responsibility and procedures to ensure the safe use of chemicals in the Facility.

16. Annually provide an update and overview to the Project Officer, of the Facility Chemical Hygiene Plan, Health and Safety Plan, and Standard Operating Procedures; the Occupational Safety and Health Administration, Resource Conservation and Recovery Act policies, responsibilities and procedures to maintain regulatory compliance and ensure a safe working environment associated with the Facility.

17. Assist with in-house and extramural inspections and tours. This shall include project descriptions, posters, and presentations. The contractor shall assist with the design, development, maintenance and updating of interactive electronic poster and virtual tour presentations.

18. Provide other support and services of a Facility-wide nature which are not specifically mentioned or detailed herein but are related to requirements specified in the subject contract PWS.

We do not anticipate the need for any dedicated contractor staff to be located at these ancillary facilities.

Performance Work Statement - Attachment 1
Agency Personal Verification Procedures
for Contractor Personnel
October 2006

Background: Homeland Security Presidential Directive 12 (HSPD-12), signed on August 27, 2004, requires a Government-wide, common identification standard for all Federal and contractor employees requiring physical access to Federally controlled facilities and/or logical access to Federally controlled information systems. The goals of HSPD-12 are to enhance safety and security, increase Government efficiency, reduce identity fraud, and protect personal privacy.

HSPD-12 requires that the common identification be: (a) issued based on sound criteria for verifying an individual employee's identity; (b) strongly resistant to identity fraud, tampering, counterfeiting, and terrorist exploitation; (c) rapidly authenticated electronically; and (d) issued by providers whose reliability has been established by an official accreditation process.

HSPD-12 and its common identification standard require personal identity verification (PIV), background investigations, and suitability determinations for all affected contractor and subcontractor personnel. In accordance with FAR clause 52.204-9, Personal Identity Verification of Contractor Personnel, contractors and subcontractors must comply with EPA=s master plan for implementing HSPD-12.

a) Contractor Requirements for Personal Identity Verification of Contractor Personnel (including subcontractors)

Contractor Employees Requiring Access to EPA facilities or EPA Information Systems for at Least 24 Hours a Week for at Least 6 Months: All individual contractor employees whose work under the contract requires on-site access to an EPA controlled facility or logical access to an EPA information system for at least 24 hours a week for at least 6 months a year, will be required to undergo a background investigation in order to receive an EPA Personnel Access and Security System (EPASS) badge
.
To begin the PIV process, the contractor should submit to the Contracting Officer Representative (COR) within ten (10) days of contract award or contract modification with this Attachment to Work Statement “Agency Personal Verification Procedures for Contractor Personnel,” the following information in electronic format via secure means using the HSPD-12 Contractor Template found at http://epa.gov/oam/. The template was developed to assist in the

transmission of the required contractor employee information in a uniform format. The template also contains drop down menus when entering data in various data cells. Specifically, the 8 data

elements, Employee Type, Program Office, Work City and State, Birth State, Birth Country, Citizenship, Previous Investigation and Investigative Agency, contain drop down menus.

- Contract number;
- Contract expiration date;
- Name, address, and phone number of the Contractor Program Manager point of contact;
- Name, date of birth, place of birth (city, state, country), and Social Security Number for all contractor employees identified above. (NOTE: This information must be protected at all times, including during transmission, according to the requirements of the Privacy Act of 1974; see http://www.epa.gov/privacy/);
- Employee Type, Position, Email address, Program Office, Work City and State,

1. An indication of which contractor employees are foreign nationals;

- Name of each contractor employee claiming to have a previous, favorably adjudicated Federal background investigation on record, and the name of the Federal Agency that required the investigation, and the completion date.

The contract-level COR will upload this information to the Office of Administrative Services Information System (OASIS) personnel security database.

After submission of the preliminary information, the contractor will be notified by the contract-level COR or PSB when to begin providing all information on Standard Form (SF) 85P, Questionnaire for Public Trust Positions, and submit the form electronically to PSB via the Office of Personnel Management's (OPM's) Electronic Questionnaires for Investigations Processing (e-QIP) system. Instructions for using e-QIP, filling out, and submitting the SF 85P on-line, can be found at http://www.opm.gov/e-qip/reference.asp. As part of the investigative and EPASS badging processes, contractor employees must be fingerprinted, photographed and provide two forms of identification, at a time and location specified by the COR. These fingerprints will be sent to the Federal Bureau of Investigation (FBI) for processing.

Contractor employees with a favorably adjudicated Federal background investigation at the National Agency Check and Inquiries (NACI) level or above, completed within the past 5 years and verified by EPA, do not require an additional investigation unless one is requested by the Contracting Officer (CO) or Contract-level Contracting Officer Representative (COR). These employees must still be fingerprinted at a time and location specified by the COR.

In order to prevent any interruption of contractor services pending the completion of the OPM background investigation, the Office of Administrative Services (OAS) Security Management Division (SMD) has procedures in place to issue temporary or provisional badges.

When reporting in person, as directed by the contract-level COR, contractor employees must provide two forms of original identity source documents from the lists on Form I-9, OMB

No.1615-0047, Employment Eligibility Verification (available at http://www.formi9.com/i-9.pdf) At least one document shall be a valid State or Federal Government-issued picture identification.

Contractor Employees Requiring EPA Access for Less than 24 Hours a Week for 6 Months: These contractor employees may be subject to the above requirements, and may have limited and controlled access to facilities and information systems.

Foreign National Contractor Employees: To be eligible to work on-site at an EPA controlled facility or to access EPA information systems, a foreign national contractor employee must have been admitted to the U.S. on an Immigrant Visa or a Non-Immigrant Work Authorization Visa. Foreign nationals requiring access to an EPA controlled facility or EPA information system for at least 24 hours a week for at least 6 months a year must meet the above requirements for an EPASS badge, and in addition:

- In the "Continuation Space" on the SF 85P, provide the visa number, issuance location, and issuance date for the visa used for entry to the U.S;
- When presenting two identification source documents, as described above, provide at least one from List A on Form 1-9.

When determining a foreign national contractor employee's eligibility for an EPASS badge, EPA will consider the type of visa presented (immigrant vs. non-immigrant) and the reciprocity agreement between the U.S. and the individual's country of origin. These considerations are in addition to the "red flag" issues listed below.

Screening of the SF 85P: Information contained on the SF 85P may demonstrate that a contractor employee is not suitable to be given access to EPA facilities or information systems. PSB will screen information entered on the SF 85P prior to OPM initiating the background investigation. For individuals with admitted, derogatory information, issuance of an EPASS badge may be delayed pending further EPA review. Contractors are responsible for providing qualified personnel in accordance with requirements stated elsewhere in this contract. Contractors will only be notified by the COR if any contractor employee is found unsuitable to perform as a result of a background investigation, and must be immediately replaced by the contractor. The following are possible "red flags":

- Employment - Having been fired from a previous job, or having left under unfavorable circumstances within the past 7 years (Question 12 on the SF 85P);
- Selective Service - Failure to register with the Selective Service System; this applies to male applicants born after December 31, 1959 (Question 17 on the SF 85P);

- Police Records - Within the past 7 years, any arrest, charge, or conviction that has been upheld for violent or dangerous behavior or a pattern of arrests that demonstrates disregard for the law (Question 20 on the SF 85P);
- Illegal Drugs - Illegal use within the previous year, or drug manufacture or other involvement for profit within the past 7 years (Question 21 on the SF 85P).

b) Returning Badges

The contractor is responsible for ensuring that all badges are returned to the COR at the conclusion of the contract or when contractor on-site services are no longer required, or when an individual contractor employee leaves.

c) Subcontracts

These requirements must be incorporated into all subcontracts wherein employees= work under the subcontract requires physical access to an EPA controlled facility or logical access to an EPA information system for 6 months or longer.

d) Appeals

Contractors have the right to appeal, in writing to the COR, a determination to deny or revoke a badge. If the COR believes an appeal is justified, he/she will forward it to:

U.S. Environmental Protection Agency
Personnel Security Branch (Mail Code 3206M)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

PSB’s decision on behalf of the Agency will be final and not subject to further appeal.

e) Definitions

- “EPA Information System” means an information system [44 U.S.C. 3502(8)] used or operated by EPA, or a contractor of EPA or other organization on behalf of the Agency.

- "EPA Controlled Facilities" means:
  - EPA or Federally-owned buildings or leased space, whether for single or multi-tenant occupancy, and its grounds and approaches, all or any portion of which are under the jurisdiction, custody or control of the Agency;
  - EPA or Federally controlled commercial space shared with non-government tenants. For example, if a department or agency leased the 10th floor of a commercial building, the Directive applies to the 10th floor only;

  - Government-owned contractor-operated facilities, including laboratories;
  - The term does not apply to educational institutions that conduct activities on behalf of departments or the agency or at which Federal Employees are hosted unless specifically designated as such by the sponsoring department or agency.
  - "Foreign National" means an individual who is not a United States citizen.

PERFORMANCE WORK STATEMENT - ATTACHMENT 2

REPRESENTATIVE RESEARCH PROJECT DESCRIPTIONS

The specific projects that will be underway at any time will vary depending on the needs of the Laboratory's research requirements. Recent operations as well as future research are described below and are intended to be indicative of the wide range of activities which may require support through this proposed contract.

1. "Simulated Water Distribution System- Demonstration"

The EPA designed and fabricated the distribution system simulator (DDS) to evaluate and understand the dynamics which influence water quality within water distribution infrastructure systems in the United States and worldwide. The system also provides researchers with a tool to evaluate the effects of water conditioning on the quality of delivered water. Results from such research will be used to provide guidance on how to maintain high water quality during distribution. A secondary objective of this project is to develop, evaluate, and demonstrate real time monitoring of water quality parameters within distribution systems using remote telemetry. Results from this research will be used to provide guidance on how to remotely monitor water quality within distribution systems.

- "Water Security Research"

EPA's National Homeland Security Research Center (NHSRC) in conjunction with NRMRL conducts several on going experiments at the Test and Evaluation Facility. The DSS mentioned above is often used to perform this testing and evaluation of water quality sensors and monitoring systems. The contractor injects contaminants and records the response of many different sensor systems on the distribution system simulators at the T&E Facility. The contractor also supports the field deployment (Operation and Maintenance) of several sensor systems being tested in contaminant warning systems at off site water facilities. The contractor supports decontamination experiments on the clear PVC pipe loop and diffusion testing on the hydrant loop. The contractor also tests various algorithm based detection software products for NHSRC. The contractor supports biofilm research for NHSRC on biofilm reactors in the BSL-2 area. New sensor testing equipment is identified and procured each year by the contractor in conjunction with the EPA Work Assignment Manager. The contractor may be required to support up to 2 NHSRC guest researchers per contract year. These researchers typically will utilize a section of a water simulator for their research needs and it will be coordinated with the other on going projects at the lab. It has been necessary in certain instances for the contractor to assemble testing apparatus at the T&E Facility and ship the equipment to more secure test facilities where more dangerous contaminants can be tested versus the sensor equipment. This

will be determined on a case by case basis. Previous collaborations of this type have been with the U.S. Army Edgewood

Chemical and Biological Center in Edgewood, Maryland and the National Air and Radiation Environmental Laboratory in Montgomery, Alabama. Some contractor travel will be required to support this equipment.

3. "Small Package Plant Systems Research"

There are approximately 50,000 small community systems and 110,000 small non-community systems in the United States accounting for over 65 million people. Public water systems in small communities of less than 10,000 people have difficulty complying with the ever increasing number of regulated contaminants. It has been estimated that over 150,000 violations of the Safe Drinking Water Act and Amendments (SDWAA) of 1996 occur annually. Small systems normally do not have the large pool of trained engineers and scientists to deal with the evaluation and testing of complex equipment or deal with the constantly changing treatment standards and needs. The most significant requirements for small systems are low construction and operating costs, simple operation, adaptability to part-time operators, low maintenance, and no serious residual problems. EPA has determined that package plants for filtration and disinfection of drinking water and point-of-use/point-of-entry(POU/POE) units for the household could be potentially the best solution for many small system applications. Various package plants and POU/POE devices are purchased, donated, and designed/fabricated and then installed and tested at the U.S.EPA T&E Facility.

4. "Impact of Nanomaterials on the Fate of Organic Pollutants"

Zero-valent iron, titanium dioxide, and silica particles are found in water in sizes less than 100 nanometers. Aggregation of nanoparticles in drinking water sources potentially impact the fate of organic pollutant removal (trichloroethylene) by granular activated carbon (GAC) adsorption. EPA is conducting studies on the aggregation behavior of nanomaterials in the presence of natural organic matter to more closely model conditions in natural water. Specifically EPA is 1) examining the interaction of nano zero valent iron, titanium dioxide, or silica with organic contaminants in water containing humic acid to better understand the degree of adsorption of organic pollutants on these materials, 2) conducting adsorption isotherm studies of organic pollutants in the presence of nanomaterials and natural organic material (NOM) on GAC, 3) examining the efficacy of a GAC adsorber bed in removing organic pollutants in the presence of nanoparticles and NOM, and 4) determining the best approach in removing nanomaterials (e.g., coagulation, membrane filtration).

- Membrane Technologies For Solvent/Biofuel Recovery And Dehydration

Pervaporation and vapor permeation are membrane-based separation processes used for the purification or separation of liquid (pervaporation) or vapor (vapor permeation) mixtures. One side of a non-porous membrane is exposed to a liquid or vapor feed stream and a vacuum or sweep gas is applied to the other side (permeate). The component or components targeted for removal permeate the membrane into the permeate stream. The reduced partial pressure of compounds in the permeate provides the driving force for the separation. The slowly permeating components remain in the feed-side residual, and can be considered purified. The selectivity of the membrane dictates the separation, based on the permeability of the component to be removed from the feed stream. Early pervaporation research at EPA dealt with the removal of multiple volatile organic compounds (VOCs) from water using existing and novel membrane materials. Currently, the EPA is investigating the use of pervaporation and vapor permeation to recover and concentrate biofuel compounds produced during the fermentation of biomass, such as ethanol and butanol. This project involves membrane experiments and fermentation experiments at both the bench- and pilot-scales.

6. "Evaluation of Advanced Oxidation Processes for Removal of Contaminants from Drinking Water"

Methyl tert-butyl ether(MTBE) is the most common fuel oxygenate that is used in more than 80 percent of oxygenated fuels. MTBE-containing fuels have significantly reduced carbon monoxide and ozone emission levels in many urban areas. However, MTBE has been identified as a potential carcinogen, and its potential persistence in drinking water supplies has recently raised many environmental and health-related questions. The Water Supply and Water Resources Division of the USEPA is currently investigating the technical and economic feasibility of utilizing a combination of advanced oxidation technologies, (e.g., UV radiation, ozonation, and hydrogen peroxide) to remove MTBE from contaminated drinking water supplies. AOP evaluations provide basic information on the removal of volatile organics and waterborne pathogens from source waters to document the potential risk of these organisms in public water supplies. EPA is conducting AOP projects that involve the installation, operation, and analysis of various combinations of oxidants (UV, ozone, hydrogen peroxide, titanium dioxide, permanganate) over a wide range of operating conditions and water quality characteristics in support of the Contaminant Candidate List and the Disinfectant/Disinfection Byproduct Rules.

7. “Phytoremediation Studies in Environmental Chambers”

The objective of this project is to conduct phytoremediation studies in a controlled environment. In order to conduct these studies, two environmental growth chambers were designed and constructed. These chambers were custom-built and have the ability to automatically monitor and control temperature, humidity, lights and air flow rates over a wide range of environmental conditions. Phytoremediation is the name given to a set of processes which involve the use of vegetation for the treatment of contaminated soil or water. The process uses plants and their rhizospheric (the area immediately surrounding the roots) microorganisms to remove contaminants located in the contaminated matrix. To accurately measure the interactions between plant, soil, water, and air, it was necessary to fabricate growth chambers with a "closed" environment where these interactions can be measured accurately. Two environmental chambers equipped with a variety of electronic sensors and control equipment were built for this purpose at the U.S. EPA Test & Evaluation (T&E) Facility in Cincinnati, Ohio. These two environmental controllable growth chambers are capable of sustaining plants, accurately maintaining environmental conditions, and monitoring a variety of airborne contaminants.

8. "Remote Water Quality Monitoring and Control of Small Drinking Water Treatment Systems"

Available data indicate the current small system drinking water treatment technology is not always adequate to meet current regulations. The regulations include the Enhanced Surface Water Treatment Rules, Disinfectant/Disinfection By-Product Rules, the Total Coliform Rule, and the Ground Water Rule. Thus, EPA initiated research studies to evaluate the cost and reliability of package plant technologies, performance data, and amenability to remote monitoring and control. The design of remote monitoring and control systems depends upon the location, availability of existing electronic hardware for remote communication, types of communication media available at that location, parameters proposed to be monitored, system scalability and desired networking options. During implementation, it is essential to provide proper training to on-site personnel and ensure that periodic sensor/instrument calibrations are performed for data validation.

9. "Source Water Early Warning Monitoring and Detection-Technology Evaluation & Demonstration"

The purpose of this research is to evaluate and demonstrate the ability to reliably monitor source water quality using biological organism as sensors. Biological organism such as daphnia magna (D. magna) change behavior dramatically from calm movement typically observed in non-polluted water to hyper-activity in water with certain pollutants. Other organism such as clams or algae exhibit similar behavioral changes to various pollutants. EPA is currently in the process of evaluating various biosensors at the U.S. EPA Test & Evaluation (T&E) Facility in Cincinnati, Ohio. The use of multiple species for biosensing is recommended to obtain a wider

range of bio-analysis of the water and provide a more complete understanding of quality and safety of the water supply. For example, a biosensor using D. magna as the sensing organism may respond better to pesticides whereas a biosensor using algae as the sensing organism may respond better to herbicides. There is an increasing concern that drinking water utilities may be vulnerable to disruption from various point and non-point pollution sources. EPA is currently evaluating several sensors including a Daphnia Toximeter, Algae Toximeter, Clam Toximeter and other Fish Monitors. These sensors measure subtle behavioral responses of these organism and relate the measured information to a "toxicity index." It is known that the responses of different organism vary in their sensitivity to different substances. These investigations should provide insight into the quality and safety of source water and watershed ecology.

10. Future: Water & Wastewater Infrastructure, Global Climate Change, and Urban Water Cycle

During the past century, the treatment and distribution of drinking water along with the collection, treatment, and discharge of wastewater have significantly contributed to the extremely high quality of life we enjoy in terms of public health and aquatic ecosystems. The introduction and implementation of rapid sand filtration and disinfection of drinking water during the first half of the 20th century has tremendously reduced infant mortality and extended people's lives. More recently in the last 30 years, new treatment technologies such as granular activated carbon, membranes, alternative disinfectants, and new pipe materials have allowed society to focus on long-term chronic disease mitigation. The implementation of activated sludge processes, the separation of collection systems, and various disinfectants along with a massive Federal Construction Grants Program have not only restored many of our Nation's waterways, but also protected less impaired streams from further degradation as well as protected drinking water sources from point sources of pollution.

However, the United States is at a crossroads where we are in danger of losing the public health, economic, and aquatic ecosystem health gains that we achieved during the last century because of a myriad of factors. Economically, the United States has been living off excess capital of our buried water infrastructure and treatment works providing drinking water and wastewater services as almost a "free good." Our deteriorating infrastructure is testament to the need for new, innovative, and cost-efficient solutions to meeting the challenges of the 21st century. Emerging contaminants pose a threat to both our drinking water and wastewater treatment. Thousands of new chemicals are being produced annually, many with the potential of disrupting human and aquatic endocrine systems. These endocrine disrupting chemicals and their metabolites as well as alternative disinfection by-products pose substantial challenges to our analytical and treatment capabilities. Global climate change is an overarching factor that

will, if not already, require the water industry to adapt its processes in order to treat drinking water sources that could become scarce and highly variable in quality and quantity. Wastewater utilities could be dealing with receiving streams than can no longer assimilate the wastes being discharge into it. Concurrently, there are land use and demographic shifts taking place within the United States further exacerbating water supply availability and quality issues. Related to the concern of global warming is the cost of energy and greenhouse gas emissions. The water industry is the Nation's third largest consumer of water, accounting for approximately 5% of the total energy used in the United States and is a producer of greenhouse gases. The cost of energy is a major factor in a consumer's water bill.

EPA's current step-wise multiple barrier approach to protecting source water, treating and distributing drinking water, collecting, treating, and discharging of the wastewater will (in the future) no longer be adequate to provide for the Nation's public and economic health and environmental sustainability. Legislatively, technologically, and institutionally, we must take a

holistic watershed approach to the urban water cycle. We can no longer be satisfied with only incremental improvements in water treatment technology, optimizing treatment trains in order to shave energy costs, and allow our streams and waterways to degrade to levels unseen in the last 40 years. Whereas water quantity only used to be an issue for the Western United States, scarcity and degraded drinking water sources could become a reality for much of the water-rich Eastern United States.

As such, EPA is proposing a new paradigm shift in the water industry. The drinking water treatment industry must look beyond its current technological boundaries and consider new materials for both treatment and pipes, nanoparticles, real-time monitoring and control, and technological innovations from other industries in order to mitigate the risks from emerging contaminants, reduce energy cost, reduce greenhouse gas emissions, reduce residuals generation, and provide safe drinking water while being able to maintain fire flow protection, all at a reasonable cost. These needs will also drive a new approach to the distribution of drinking water and collection of wastewater causing a merging with the wastewater industry in the management of point and non-point sources of pollution and water volume. It is likely that not only could there be dual distribution systems, satellite treatment, new network design and operation but also multiple piping and treatment systems providing reused water for irrigation, blackwater treatment on-site or at the decentralized neighborhood scale, multiple stormwater best management practices, and in-line wastewater treatment. In terms of wastewater treatment, a paradigm shift is also necessary in that the basic unit processes have not essentially changed within the past 100 years. High energy, high greenhouse gas emission aerobic processes must give way to significantly better anaerobic processes, membranes, and alternative disinfectants in

order to reduce their carbon footprint, remove emerging contaminants and their degradation products, and even become distributed generators of energy as opposed to being energy consumers.

Given this need to re-invent the way we protect, treat and distribute drinking water, collect, treat, and discharge wastewater, EPA's water and wastewater research program must change and become even more of an international leader in the holistic approach to source water and watershed management. The outline below should be considered as merely a starting point in outlining the research direction and areas we plan to move this research program.

I. Drinking Water Treatment
   - A. New membrane materials
   - B. Nanoparticle media
   - C. Nano-coated media
   - D. New catalysts
   - E. New disinfectants
   - F. Hybrid combinations

II. Quad-Distribution Systems

   - A. Drinking water
   - B. Fire flow
   - C. Grey water
   - D. Black water
   - E. Satellite/decentralized treatment/energy production
   - F. Network Design
   - G. Water storage location and design of tanks
   - H. Real-time monitoring, control
   - I. Household plumbing design/retro-fit
   - J. In-line wastewater treatment/collection system

III. Wastewater Treatment
   - A. Replace aerobic processes
   - B. Anaerobic unit processes
   - C. Membranes
   - D. Alternative disinfectants
   - E. Distributed Energy and fuel generation

The cost and performance of all of these technologies must be evaluated and/or adapted in terms of their proof of concept, tested at the bench/pilot/field-scale, and demonstrated over the

long-term for operational and maintenance viability. As this vision develops and is implemented, our workforce planning must be integrated and even precede these new approaches. Thus, the contractor will provide technical support to convening a group of research specific science advisors and experts on a routine basis. The contractor will also provide support as needed to track the research specific science advisors and experts. Through these routine gatherings the EPA will further expand on the strategies to develop and begin implementing this new research program that will ultimately lead to this paradigm shift in our water industry.

11. Future: Organic Based Biofuel Research - Water/Wastewater/Water Reuse and Energy:

EPA developed (December of 2007) a draft outline in order to summarize current relationships among water, wastewater and Organic Based Biofuel (OBB) production. EPA determined that issues surrounding OBB's such as ligno-cellulosic based ethanol (LCBE) production and corn based ethanol (CBE) afford collaborative research opportunities. Although, researchers do not dismiss the possibility of water related research in CBE plants, EPA researchers believe priority should be given to LCBE water related research because:

- Corn based ethanol plant technology is well advanced compared with LCBE.
- LCBE production, at industrial scales, is in its infancy.
- By most accounts, corn-based ethanol is less efficient (potentially) than LCBE, and by some accounts, corn based ethanol is not sustainable in the long term to meet US fuel needs.

Significant challenges, with respect to water usage/WW treatment in OBB production, include: 1) wide variety of possible feedstocks 2) variety of production processes in development. This research will provide critical data on WW treatment/reuse for irrigation of biofuel feedstock crops. It will also provide results/guidance for appropriate technologies for water reuse within OBB plants. Research on the use of water hyacinth will integrate WW treatment techniques with biofuel feedstock production. The target outcome for stakeholders is to alleviate stress on water resources in regions where biofuel feedstocks are produced and to reduce the carbon footprint of OBB production.

12. Future: Evaluation of Drinking Water and Wastewater Treatment Technologies for Removal of Endocrine Disrupting Compounds (EDCs) and Pharmaceuticals and Personal Care Products as Pollutants (PPCPs)

A number of the chemicals identified as potential EDCs and PPCP's may be present in surface or ground waters used as drinking water sources due to their introduction from domestic and industrial sewage treatment systems and wet-weather runoff. Many of these compounds have

already been shown to be present in surface waters in the U.S., leading to concerns over the possible presence of EDCs and PPCP's in drinking waters. Although there has not yet been a determination of risks posed by EDCs and PPCP's in finished waters, it is prudent to explore if strategies already employed to manage other drinking water risks can also manage risks associated with them. EPA will investigate the efficacy of various drinking water treatment processes in removing EDCs and PPCP's from source waters. EPA's ongoing research will provide information on the ability of various drinking and wastewater treatment technologies to remove PPCP's and EDCs that may be present in waters.